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Faculty of Science and Technology
Department of Computer Science & Technology
End Semester Examination –September/October 2013
CST226-2 Software Engineering & Quality Assurance



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Answer all questions.

Time Allowed: Two (02) Hours.

- 5 mark
6 mark
3 mark
6 mark
3 mark
1. a. Giving reasons for your answer based on the type of system being developed, suggest the most appropriate Generic Software Process Model that might be used as a basis for the development of the following systems.
 - i. A system to control anti-lock braking in a car
 - ii. A virtual reality system to support software maintenance
 - iii. A university accounting system that replaces an existing system
 - iv. An interactive travel planning system that helps users plan journey with the lowest environment impact (8 mark)
 - b. Describe the Software Process Model that you have selected in **section a. part i.** indicating its strengths and weaknesses. (8 mark)
 - c. Briefly explain how evolutionary development might handle the system requirements that are evolving over a period of time. (3 mark)
 - d. Explain how Software Prototyping can improve the quality of a software system during the following phases of the software life cycle.
 - i. Requirements analysis and specification
 - ii. Design (4 mark)
 - e. What are the four (4) sectors in Spiral Model of software development? (2 mark)
2. a. What are the differences between generic software product development and custom software product development? (4 mark)
 - b. Software Engineers have responsibilities to the engineering profession as well as to the society. Explain four (4) guiding principles included in the Software Engineering Code of Ethics by IEEE-CS/ACM task force. (4 mark)

- b. What are the alternative methods that can be used to write the Software Requirement Specifications rather than using Natural Language? (3 mark)
 - c. What is meant by "risk" in Software Engineering? Briefly explain three (3) types of risks with examples. (7 mark)
 - d. What are the human factors that need to be concerned when designing a User Interface for a software system? (3 mark)
 - e. List three (3) Architectural Design Styles and explain one (1) of them. (5 mark)
4. a. It states that "Testing can only detect the presence of error, not their absence". Do you agree with this statement? Justify your answer. (3 mark)
- b. Briefly describe the three (3) main types of software maintenance. Use examples to explain why it sometimes difficult to distinguish between them? (8 mark)
- c.
- i. Explain what is meant by "Software Evolution" and discuss the need to plan for the future evolution of software during its initial development. (4 mark)
 - ii. Outline three (3) specific laws of Software Evolution as formulated by Lehman. (3 mark)
- d. Explain the difference between "White box testing" and "Black box testing" with respect to program testing. (4 mark)
- e. Producing documents in software process is really important as documents are the tangible manifestation of the software. What are the three (3) types of Document Standards? (3 mark)

End of the paper

c.

- i. Do Software Engineers have a professional responsibility to produce code that can be maintained and changed even if this is not explicitly requested by their employer? (3 mark)
- ii. "Delivering the software quickly without compromising the system quality is one of the key challenges faced by the software organizations." (4 mark)
Do you agree with the above statement? Justify your answer.

- d. Develop a network for the activities listed in the following table and identify the critical path for that. (6 mark)

Activity		Dependencies	Duration (days)
A	Problem definition		20
B	Team selection		30
C	Feasibility Study	A	40
D	Detailed Design	C	20
E	Hardware Selection	B	10
F	Team Training		60
G	System Coding	D	40
H	System Testing	F	30
I	Integration	G,H	60
J	End-user Training	K	10
K	Documentation	E	20
L	Commissioning		20

- e. Briefly explain the phases in Rational Unified Process. (4 mark)

3. a. Following is a statement of requirements for part of a ticket-issuing system.

An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account is charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card and a personal identifier. When the credit transaction has been validated, the ticket is issued.

- i. Among User Requirements and System Requirements, what would be the requirement type above statement belongs to? Justify your answer. (3 mark)
- ii. Identify Functional and Non-functional Requirements for the above system. (4 mark)